

AURORAL CURRENT AND ELECTRODYNAMICS STRUCTURE MEASURED BY TWO SOUNDING ROCKETS IN FLIGHT SIMULTANEOUSLY.

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ABSTRACT: On January 29, 2009, two identically instrumented sounding rockets were launched into a sub-storm auroral arc from Poker Flat Alaska. Labeled the Auroral Currents and Electrodynamics Structure (ACES) mission, the payloads were launched to different apogees (~350km and ~120km) and staggered in time so as to optimize their magnetic conjunctions. The different altitudes provided simultaneous in-situ measurements of magnetospheric input and output to the ionosphere and the ionospheric response in the lower F and E region. Measurements included 3-axis magnetic field, 2-axis electric field nominally perpendicular to the magnetic field, energetic particles, electron and ion, up to 15keV, cold plasma temperature and density. In addition, PFISR was also operating in a special designed mode to measure electric field and density profiles in the plane defined by the rocket trajectories and laterally to either side of the trajectories. Observation of the measured currents and electrodynamics structure of the auroral form encountered are presented in the context of standard auroral models and the temporal/spatial limitations of mission designs.